

1 **What is claimed is:**

1 1. A method of manufacturing polymeric foam using
2 supercritical fluids, comprising the steps of:

3 (a) placing a foamable polymeric material in a mold;

4 (b) introducing a supercritical fluid through the mold
5 at a first temperature and at a first pressure for
6 a time period sufficient to impregnate the
7 polymeric material; and

8 (c) changing the first temperature and the first
9 pressure to a second temperature and a second
10 pressure sufficient to produce the polymeric foam
11 having microcells.

1 2. The method as claimed in claim 1, wherein the method
2 is performed using a compression molding machine.

1 3. The method as claimed in claim 1, wherein the method
2 is performed using an injection molding machine.

1 4. The method as claimed in claim 1, wherein the
2 supercritical fluid is a supercritical gas.

1 5. The method as claimed in claim 4, wherein the
2 supercritical fluid is supercritical carbon dioxide or
3 supercritical nitrogen.

1 6. The method as claimed in claim 1, wherein the
2 polymeric material is selected from a group consisting of
3 thermoplastics, thermoplastic elastomers, partially
4 crosslinked thermoplastics, partially crosslinked
5 thermoplastic elastomers, crosslinked thermoplastics,

6 crosslinked thermoplastic elastomers, and the combination
7 thereof.

1 7. The method as claimed in claim 6, wherein the
2 polymeric material contains a chemical foaming agent.

1 8. The method as claimed in claim 6, wherein the
2 polymeric material contains a chemical crosslinking agent.

1 9. The method as claimed in claim 6, wherein a chemical
2 crosslinking is performed in the mold.

1 10. The method as claimed in claim 6, wherein a physical
2 crosslinking is performed in the mold.

1 11. The method as claimed in claim 1, wherein the
2 polymeric material in step (a) is a shaped foamable article.

1 12. The method as claimed in claim 11, wherein the
2 polymeric material is a particulate-shaped foamable article.

1 13. The method as claimed in claim 11, wherein the
2 polymeric material is a foamable article in a form of sheet.

1 14. The method as claimed in claim 11, wherein the
2 polymeric material is a foamable article in a molten state.

1 15. The method as claimed in claim 1, wherein, in step
2 (a), the mold is fully filled with the polymeric material.

1 16. The method as claimed in claim 1, wherein, in step
2 (a), the mold is partly filled with the polymeric material.

1 17. The method as claimed in claim 1, wherein the
2 temperature of the mold is adjustable.

1 18. The method as claimed in claim 1, wherein the
2 polymeric foam obtained by the method is microcellular foam.

1 19. The method as claimed in claim 1, wherein the
2 polymeric foam obtained by the method is microcellular
3 crosslinked foam.